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(71) Applicant(s)
Motorola Inc

(Incorporated in USA - Delaware)

Corporate Offices, 1303 East Algonquin Road, Schaumburg, Illinois 60196, United States of America

(72) Inventor(s)
Chi Kin Lee
Fai Harvey Wong

(74) Agent and/or Address for Service
Sarah J Spaulding
Motorola Limited, European Intellectual Property Operation, Midpoint, Alencon Link, BASINGSTOKE, Hampshire, RG21 7PL, United Kingdom

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US 4896261 A US 4516201 A US 4174536 A

(58) Field of Search
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(54) Dynamically processing data from a coupled radio receiver

(57) A method and apparatus in a portable computing device (100) to automatically and dynamically process data received from a coupled RF receiver (102). A processor (104) within the portable computing device (100) has a message filter to (106) that determines whether the data is a message or a memory location script. For a message, the processor (104) further determines whether to store the message in a first plurality of user defined memory locations (110) or a second plurality of user defined memory locations (112). A plurality of memory location filters (108) extracts information from the message to store in at least one of the first plurality of user defined memory locations (110). For a memory location script, the processor (104) adds a new memory location to the first plurality of user defined memory locations (110) and creates a new memory location filter for the new memory location.

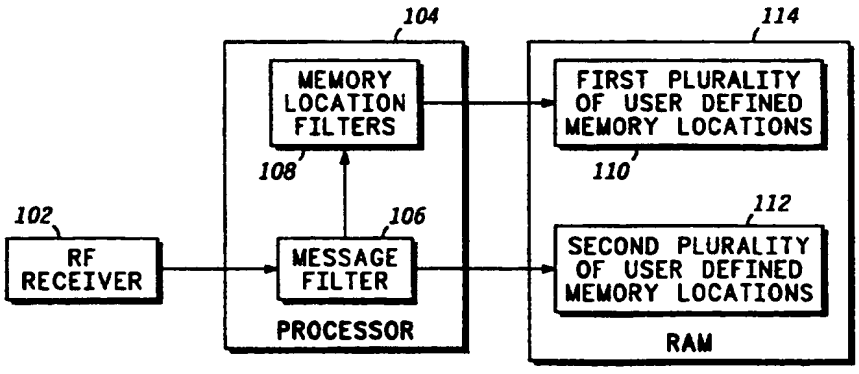

FIG. 1

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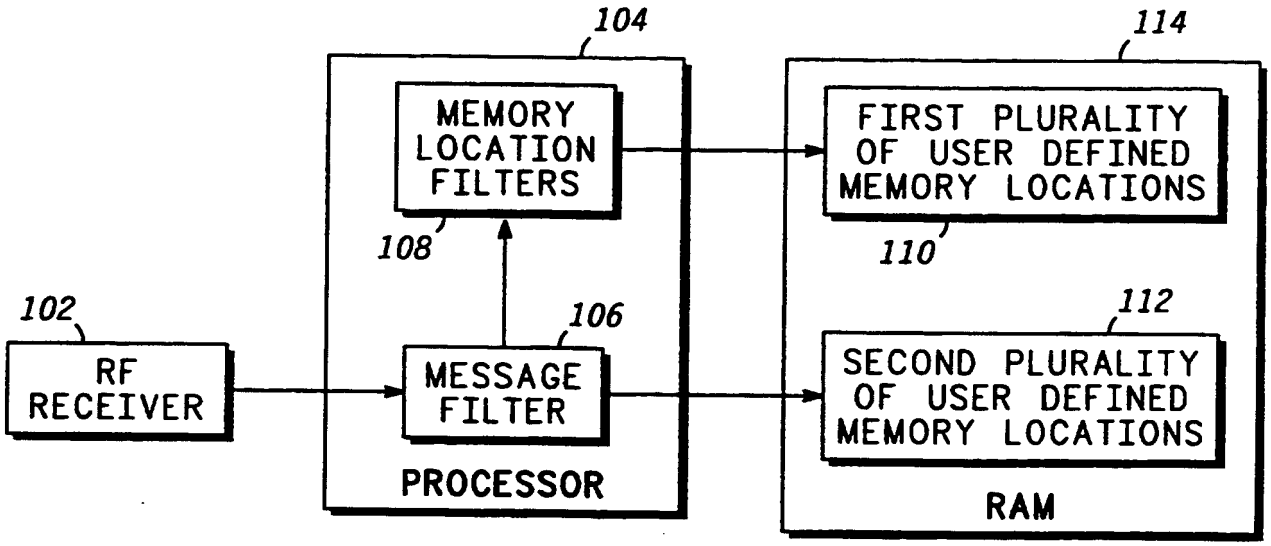
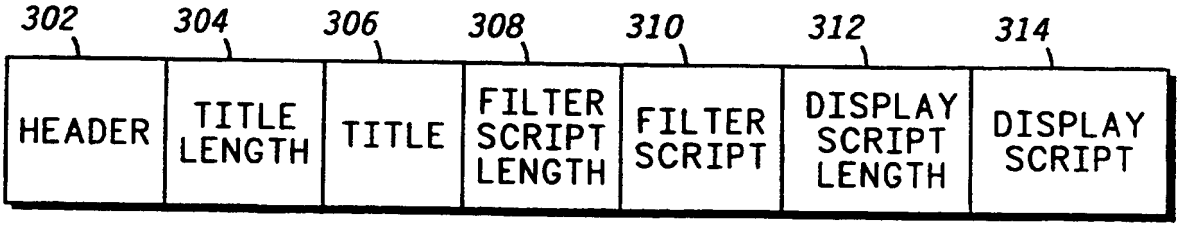


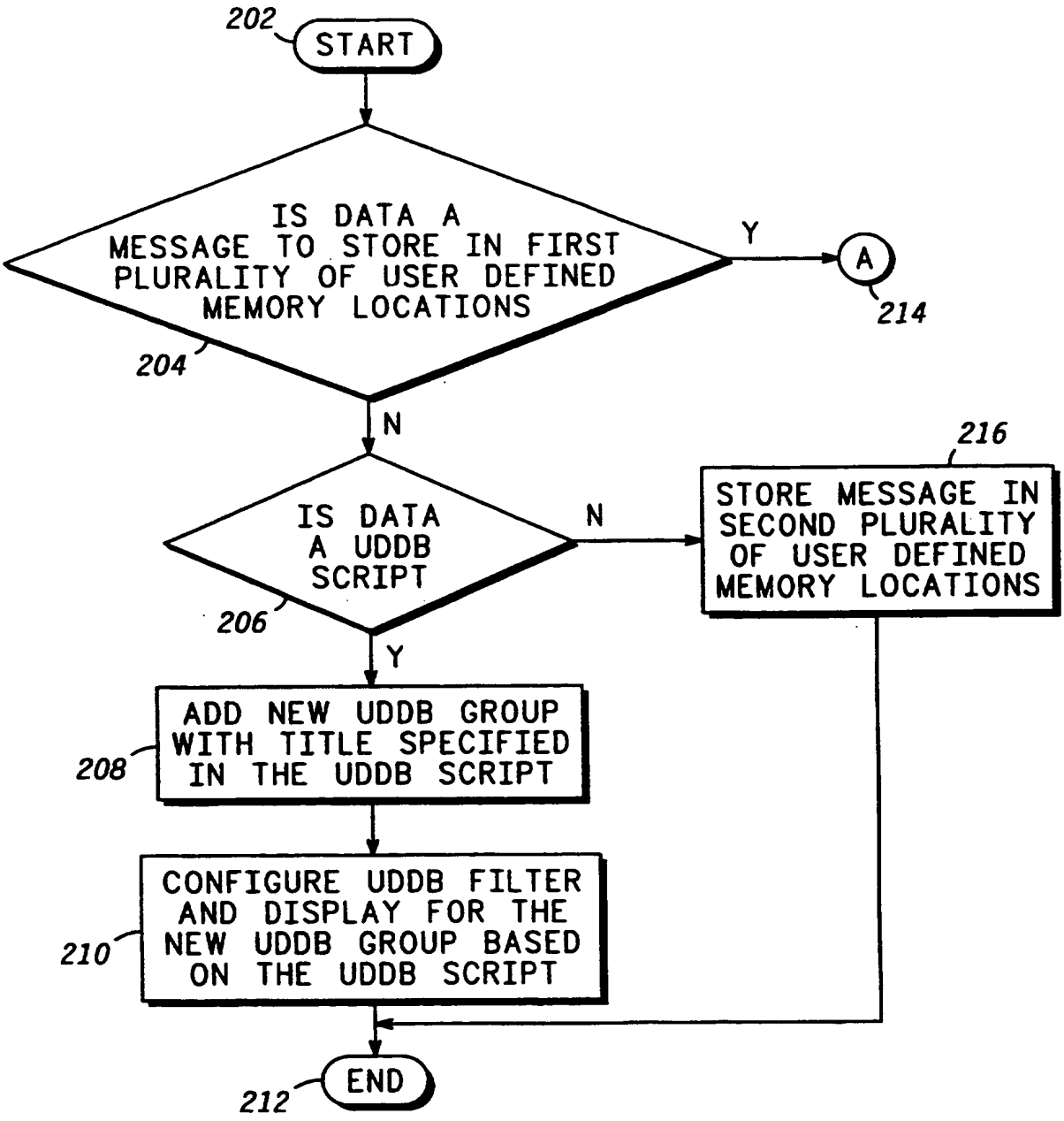
100

FIG. 1

FIG. 2

300





200

FIG. 2

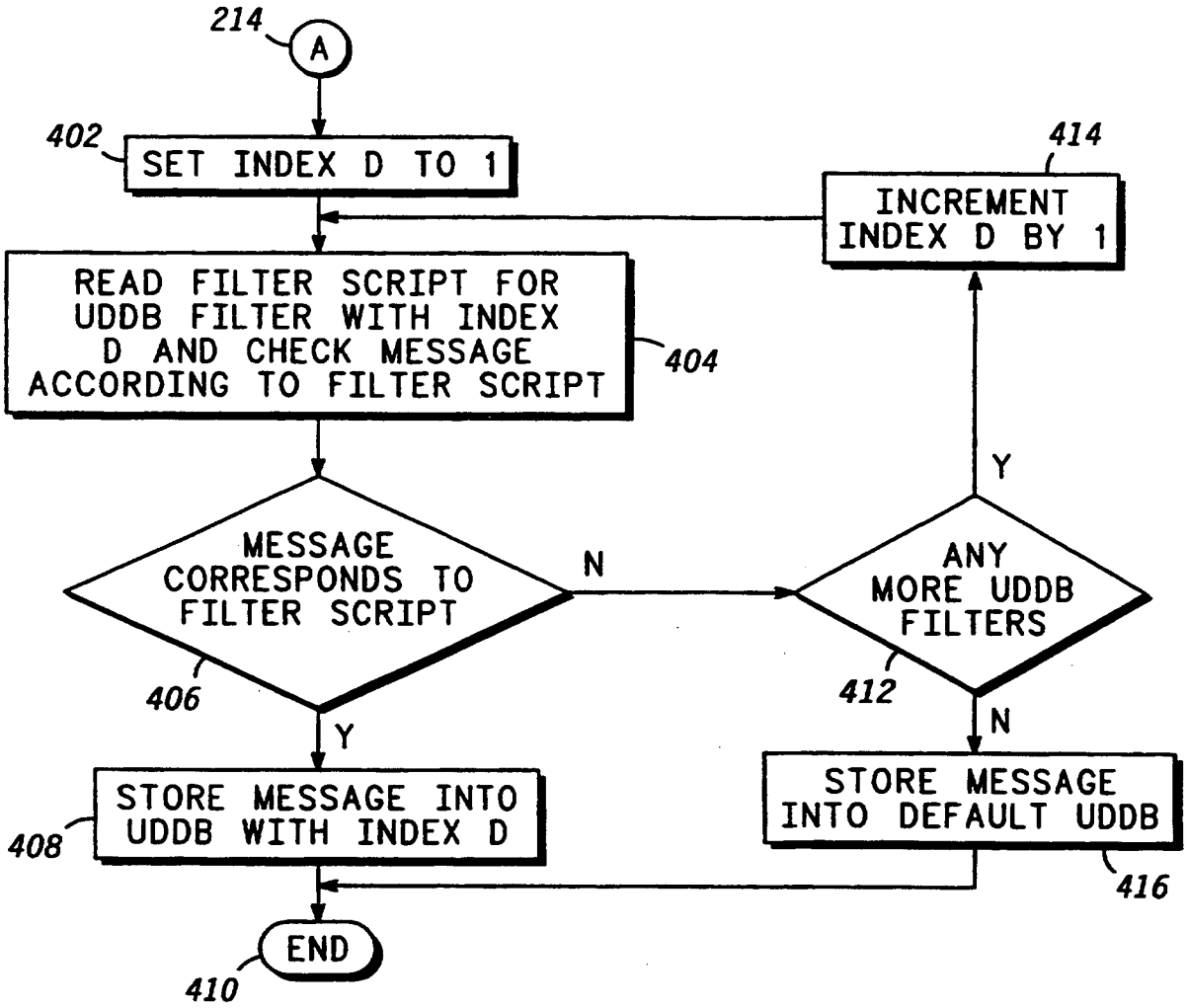


FIG. 4

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METHOD AND APPARATUS TO AUTOMATICALLY AND DYNAMICALLY PROCESS DATA RECEIVED FROM A COUPLED RADIO FREQUENCY RECEIVER

Field of the Invention

This invention relates in general to portable electronic devices receiving information from coupled radio frequency receivers and in particular to a method and apparatus in a portable computing device to dynamically process data received from a coupled radio frequency receiver.

Background of the Invention

Portable electronic devices for receiving information from radio frequency (RF) receivers are known in the art. For example, a personal digital assistant (PDA) or an electronic organizer, coupled to an RF receiver, have elements for processing information encoded in RF signals received by the RF receiver. Upon demodulating and decoding the RF signals within the RF receiver to obtain data, a user will typically perform manual actions on the PDA or the electronic organizer to further process the data.

With the advent of wireless messaging services, subscribers of such services receive information that covers a wide variety of topics. Organizing such information either for storage or display depends on settings preconfigured by service providers or by the subscribers. Typically, however, a problem faced by the subscribers is in retrieving the information without having to constantly monitor the PDA or the electronic organizer that receives the information through the RF receiver. Hence, a need exists for the service providers to improve processing of the information in order for their subscribers to automatically retrieve and organize such information effortlessly.

In addition to a problem of constant monitoring, preconfigured settings are not easily changeable to meet information varying in both content and format. Conventionally, the service providers provide different RF receivers,

or RF receivers preconfigured differently, according to their subscribers' needs. This solution, however, inflexibly restricts the subscribers to undesirable choices over which they have no control.

Thus a need exists for a method and apparatus to automatically and dynamically process data received from a coupled RF receiver.

Summary of the Invention

In carrying out the objects of the present invention in one form, there is provided a portable computing device to automatically and dynamically process data received from a coupled radio frequency receiver. The portable computing device comprises a first plurality of user defined memory locations and a processor, having a plurality of memory location filters coupled to the first plurality of user defined memory locations, for determining whether the data is a message for filtering by the plurality of memory location filters to extract information for storing in at least one of the first plurality of user defined memory locations or a memory location script for adding a new memory location to the first plurality of user defined memory locations. The processor configures a new memory location filter, in response to the memory location script, for extracting information from subsequent messages received from the coupled radio frequency receiver to store in the new memory location.

Brief Description of the Drawings

FIG. 1 is a block diagram of a portable computing device in accordance with a preferred embodiment of the present invention.

FIG. 2 shows a flow chart for a method to add a new memory location by the processor shown in FIG. 1 in accordance with the preferred embodiment of the present invention.

FIG. 3 shows a format for a memory location script in accordance with the preferred embodiment of the present invention.

FIG. 4 shows a flow chart for a method to extract information from messages in accordance with the preferred embodiment of the present invention.

Detailed Description of the Invention

In accordance with a preferred embodiment of the present invention, FIG. 1 shows a block diagram of a portable computing device 100 to automatically and dynamically process data received from a coupled radio frequency (RF) receiver 102. The portable computing device 100, such as a personal digital assistant (PDA), comprises a processor 104, a first plurality of user defined memory locations 110, and a second plurality of user defined memory locations 112. In the preferred embodiment of the present invention, the first plurality of user defined memory locations 110 and the second plurality of user defined memory locations 112 are memory locations configured within a Random Access Memory (RAM) 114 of the portable computing device 100.

Within the processor 104, a message filter 106 determines, by applying a logical operation to check a header of a message, whether to store the message, derived from the data, in at least one of the first plurality of user defined memory locations 110 or in at least one of the second plurality of user defined memory locations 112. When it is determined to store the message in the at least one of the first plurality of user defined memory locations 110, the processor 104 has a plurality of memory location filters 108, shown in FIG. 1 in accordance with the preferred embodiment of the present invention, for extracting information from the message to store in the at least one of the first plurality of user defined memory locations 110. Each of the plurality of memory location filters 108 comprises a plurality of logical operations for checking the message to extract the information and corresponds to each of the first plurality of user defined memory locations 110.

Advantageously using the message filter 106 and the plurality of memory location filters 108 in the present invention enables the portable computing device 100 to automatically process any data received from the coupled RF receiver 102. As is known in the art, conventional devices used in messaging services typically require subscribers to constantly monitor

the conventional devices to retrieve messages for storage into preconfigured memory locations. Hence, the present invention improves on the conventional devices by automatically retrieving and storing the messages in the first plurality of user defined memory locations 110 or the second plurality of user defined memory locations 110. Furthermore, the plurality of memory location filters 108 in the present invention allows the portable computing device 100 to extract information from the messages to store according to the first plurality of user defined memory locations 110.

When determined that the data is a memory location script for adding a new memory location to the first plurality of user defined memory locations 110, the processor 104 then processes the memory location script to add the new memory location. FIG. 2 shows a flow chart for a method 200 to add the new memory location by the processor 104, in accordance with the preferred embodiment of the present invention. Starting at step 202, the method 200 requires the processor 104, through the message filter 106, to determine in step 204 whether the data is a message to store in the first plurality of user defined memory locations 110. A message to store in the first plurality of user defined memory locations 110 proceeds to step 214 for subsequent processing. Otherwise, the processor 104 determines, in step 206, whether the data is a memory location script or a message to store in the second plurality of user defined memory locations 112. In the preferred embodiment of the present invention, a memory location of the first plurality of user defined memory locations 110 is termed a user definable drop box (UDDB) and a memory location script is termed a UDDB script. Hence, when the processor 104 determines that the data is a UDDB script for a new memory location or UDDB, the processor 104 adds the new memory location or UDDB to the first plurality of user defined memory locations 110 in step 208. In step 210, the processor 104, in response to the memory location or UDDB script, configures a new memory location filter, termed a UDDB filter, to extract information from subsequent messages that are received as data from the coupled RF receiver 102 for storing in the new memory location or UDDB. Step 210 additionally enables the processor 104 to provide a display script, based on the information extracted from the UDDB script, for displaying information extracted from the subsequent messages intended for storing in the new memory location or UDDB.

Dynamically configuring a new UDDB in the present invention by advantageously using the UDDB script allows the portable computing device 100 to meet changing requirements, such as new data received from the coupled RF receiver 102. Subsequent messages derived from the new data for the new UDDB, therefore, need not be in a preconfigured format for the processor 104 to store in the first plurality of user defined memory locations 110. Furthermore, the present invention does not require any hardware or software changes in the coupled RF receiver 102 or the portable computing device 100 to receive the new data. Hence, by using the portable computing device 100 of the present invention, service providers of messaging services can easily and flexibly provide their subscribers more desirable choices, such as information according to requirements or needs of their subscribers.

FIG. 3 shows a format for a UDDB script 300 for a new UDDB, in accordance with the preferred embodiment of the present invention. Following a header 302, the information enclosed and specified within the UDDB script 300 includes a title 306 for naming the new memory location or UDDB, a filter script 310 for configuring a new memory location or UDDB filter, and a display script 314 for determining the display of a message for the new UDDB. The filter script 310 comprises a new plurality of logical operations for checking messages to determine whether to store in the new memory location or UDDB. A title length 304, a filter script length 308, and a display script length 312 within the UDDB script 300 further defines the new UDDB. Hence, with the format as shown in FIG. 3, in accordance with the preferred embodiment of the present invention, the UDDB script 300 advantageously enables setting up the portable computing device 100 to receive messages without needing fixed formats as required by conventional devices. Hence, there is no need to change hardware or software within the coupled RF receiver 102 or the portable computing device 100 for configuring a new UDDB to store information extracted from messages.

FIG. 4 shows a flow chart for a method 400 to extract information from messages using the plurality of memory location filters 108 or UDDB filters, in accordance with the preferred embodiment of the present invention. Each of the plurality of memory location filters 108 corresponds to each of the first plurality of user defined memory locations 110 and includes a plurality of logical operations for checking the message to extract the

information. Starting at step 214, after the processor 104 has determined that the data is a message for storing in the first plurality of user defined memory locations 110, an index, D, is set to a value of one in step 402. Index D identifies a filter script 310 for a UDDB filter with which the processor 104 reads to check the message according to the filter script 310 of the UDDB filter in step 404. In accordance with the preferred embodiment of the present invention, each of the plurality of memory location filters 108 or UDDB filters are accorded an index number for identification. In step 406, when information within the message corresponds to the filter script 310, the message is then stored, in step 408, in one of the first plurality of user defined memory locations 110. The one of the first plurality of user defined memory locations 110 corresponds to a UDDB that is coupled to the UDDB filter indexed with the value of one in step 402. Upon the storing of the information from the message, the processor 104 ends the processing of the message in step 410.

For a message that does not correspond to the filter script 310 for the UDDB filter with the index D, the processor 104 checks whether there are any more of the plurality of memory location filters 108 or UDDB filters for extracting information from the message. Each of the plurality of memory location filters 108 or UDDB filters are sequentially read and checked in step 404 by incrementing the index D by one in step 414. A default UDDB is set up, in accordance with the preferred embodiment of the present invention, to store, in step 416, any message without a corresponding UDDB filter script.

An alternative embodiment of the present invention can include data from a single message with information for storing into multiple UDDBs or into different UDDBs of different portable computing devices. This will enable efficient usage of the single message to provide information for a wide variety of topics meant for storing into the multiple UDDBs or into the different UDDBs of different portable computing devices. Unlike conventional devices with limitations in receiving the single message for storage into different memory locations, the alternative embodiment advantageously transcends such limitations to store the single message within the multiple UDDBs or into the different UDDBs of different portable computing devices. Hence, the alternative embodiment effectively saves on receiving time of the portable computing device 100.

By now it should be appreciated that there has been provided a method and apparatus to automatically and dynamically process data received by a portable computing device from a coupled RF receiver.

We claim:

CLAIMS

1. In a portable computing device having a processor and a coupled radio frequency receiver, a method to automatically and dynamically process data received from the coupled radio frequency receiver, the method comprising the steps of:

determining whether data received from the receiver is a message to store in a first plurality of user defined memory locations;

storing the data in at least one of the first plurality of user defined memory locations when determined that the data is a message to store in the first plurality of user defined memory locations;

determining whether the data is a message to store in a second plurality of user defined memory locations or a memory location script when the data is not a message to store in the first plurality of user defined memory locations;

adding a new memory location to the first plurality of user defined memory locations when determined that the data is a memory location script wherein the memory location script includes information for defining the new memory location; and

configuring a new memory location filter, in response to the memory location script, to extract information from subsequent messages, received from the coupled radio frequency receiver, for storing in the new memory location.

2. The method of Claim 1 wherein the step of storing comprises the step of checking the message with a plurality of memory location filters to extract information from the message wherein each of the plurality of memory location filters includes a plurality of logical operations and further wherein each of the plurality of memory location filters corresponds to each of the first plurality of user defined memory locations.

3. The method of Claim 1 wherein the step of adding comprises the step of naming the new memory location with a title specified within the memory location script.

4. A portable computing device to automatically and dynamically process data received from a coupled radio frequency receiver, the portable computing device comprising:

a first plurality of user defined memory locations; and

a processor, having a plurality of memory location filters coupled to the first plurality of user defined memory locations, for determining whether the data is a message for filtering by the plurality of memory location filters to extract information for storing in at least one of the first plurality of user defined memory locations or a memory location script for adding a new memory location to the first plurality of user defined memory locations wherein the processor configures a new memory location filter, in response to the memory location script, for extracting information from subsequent messages received from the coupled radio frequency receiver to store in the new memory location.

5. The portable computing device of Claim 4 wherein each of the plurality of memory location filters comprises a plurality of logical operations for checking the message to extract the information for storing in the at least one of the first plurality of user defined memory locations.

6. The portable computing device of Claim 4 wherein the memory location script comprises a title for naming the new memory location.

7. The portable computing device of Claim 4 wherein the memory location script comprises a filter script for configuring the new memory location filter.

8. The portable computing device of Claim 7 wherein the filter script comprises a new plurality of logical operations.

9. The portable computing device of Claim 4 wherein the memory location script comprises a display script for determining display of the subsequent messages for the new memory location.

10. A portable computing device to automatically process data received from a coupled radio frequency receiver, the portable computing device comprising:

a first plurality of user defined memory locations;

a second plurality of user defined memory locations; and

a processor, coupled to the first plurality of user defined memory locations and the second plurality of user defined memory locations, for processing the data for storage wherein the processor comprises:

a message filter for determining whether to store a message, derived from the data, in at least one of the first plurality of user defined memory locations or in at least one of the second plurality of user defined memory locations; and

a plurality of memory location filters for extracting information from the message to store in the at least one of the first plurality of user defined memory locations when it is determined to store the message in the at least one of the first plurality of user defined memory locations, wherein each of the plurality of memory location filters corresponds to each of the first plurality of user defined memory locations.

11. The portable computing device of Claim 10 wherein the message filter comprises a logical operation to check a header of the message.

12. The portable computing device of Claim 10 wherein each of the plurality of memory location filters comprises a plurality of logical operations for checking the message to extract the information for storing in the at least one of the first plurality of user defined memory locations.

The Patent Office

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Application No: GB 9612858.2
Claims searched: 1 - 9

Examiner: Paul Nicholls
Date of search: 16 August 1996

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): G4A (AFGX, AKBX)

Int Cl (Ed.6): G06F 3/00, 12/00, 12/02, 13/38

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
A	US 4,896,261 A	(NOLAN) - Whole document	-
A	US 4,516,201 A	(WARREN et al) - Whole document	-
A	US 4,174,536 A	(MISUNAS et al) - Whole document	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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